



BATTERIES AND ENERGY STORAGE SYSTEMS (ESS)

WWW.CERECERTIFICATION.COM

CERE, by UL Solutions is a Testing, Simulation and Certification body that was originally set up as a Certification Entity in 2015.

CERE, by UL Solutions was created in its beginnings as a Certification Entity for Renewable Energies, with the purpose of being the access key to the different countries where certification of components, full installations certificates, modeling and software validation of components and facilities was required.

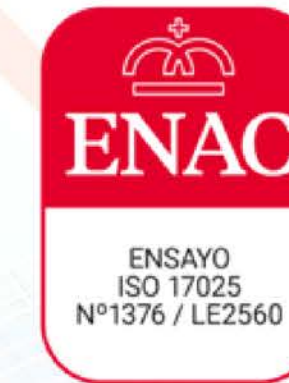
Currently **CERE**, by UL Solutions has expanded its capabilities and is dedicated not only to Renewable Energies, but also to Electric Vehicle chargers, Industrial Machinery, Medical Devices and Electrical and Electronic Products.

Accreditations

We have accreditations that verify our technical competences as a Certification Body and Testing Laboratory. This fact ensures a deep knowledge of the international requirements for components and installations.

CERE, by UL Solutions is accredited by ENAC and a2la (IAF/ILAC members) as a Certification Body according to ISO 17065; and as an Accredited Testing Laboratory according to ISO 17025. We also belong to the IEC Scheme being CBTL Testing Laboratory and NCB Certification Entity.

In addition, we can provide solutions to countries such as North America, Israel, Colombia, Korea, Australia, etc.



Our team

Our team has a long-accumulated experience in testing, simulation and certification for all its business areas, including an in-depth knowledge of grid integration standards, design, safety, EMC and grid quality.

All this knowledge is applicable in renewable energy generators and controllers, electric vehicle chargers, photovoltaic trackers, household appliances, industry, industrial machinery, electrical and electronic products and medical devices, among others.



by UL Solutions



What's CERE Batteries?

CERE, by UL Solutions Batteries is a department created to cover the demand of services for batteries and storage systems inside of **CERE** (Certification Entity for Renewable Energies)

CERE, by UL Solutions Batteries was created to provide support and trust at any stage of certification and testing of batteries and storage systems

Our services include Testing and Certification according Safety standards.

This process includes testing, certification and verification of batteries and storage systems and their components.

Applicable Standards

CERE, by UL Solutions is accredited as Certification Body and Testing Laboratory for batteries and storage systems according the following standards:



SAFETY STANDARDS FOR UL MARKET

Standard **UL 9540:2020**: Energy Storage Systems and Equipment

Standard **UL 9540A:2019**: Test Method for Evaluating Thermal Runaway fire Propagation in Battery Energy Storage Systems

Standard **NEMA 250:2014**: Enclosures for Electrical Equipment (1000 Volts Maximum)

SAFETY STANDARDS FOR INTERNATIONAL MARKET

Standard **IEC 62933-2-1:2017**: Electrical energy storage (EES) systems - Part 2-1: Unit parameters and testing methods - General specification

Standard **IEC 62933-5-1:2017**: Electrical energy storage (EES) systems - Part 5-1: Safety considerations for grid-integrated EES systems - General specification

Standard **IEC 62933-5-2:2020**: Electrical energy storage (EES) systems - Part 5-2: Safety requirements for grid-integrated EES systems - Electrochemical-based systems

Applicable Standards

CERE, by UL Solutions Batteries and ESS has a wide expertise in the field of testing. Some of the most important projects carried out recently are located in Spain.

THE OFFERED TESTING INCLUDES*:

- Bonding Conductor Test (Earth current test)
- Spacings and Insulation resistance test
- Mechanical Assembly
- Temperature (Heating) Test
- Dielectric voltage withstand and Impulse test
- EMC tests (Immunity and emissions)

(* among other test required in the certificates)

ESS TESTING REQUIREMENTS

- ✓ Temperature test (normal operation)
- ✓ Salt mist test
- ✓ Vibration test
- ✓ Thermal runaway
- ✓ Communication loss tests
- ✓ Short-circuit protection
- ✓ Overcharge
- ✓ Enclosure impact (including IK)
- ✓ IP and NEMA tests
- ✓ Corrosion tests
- ✓ Nominal Energy capacity and Efficiency
- ✓ Sound level (Noise)
- ✓ Lifting test
- ✓ etc

Grid Connection Reference Standards for ESS according the different countries

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GRID CODE

GENERAL GUIDELINES:

EN 50549-1:2019: Requirements for generating plants to be connected in parallel with distribution networks - Part 1: Connection to a LV distribution network - Generating plants up to and including Type B

EN 50549-2:2019: Requirements for generating plants to be connected in parallel with distribution networks - Part 2: Connection to a MV distribution network - Generating plants up to and including Type B

IEC 61727 Latest Version, Photovoltaic (PV) systems - Characteristics of the utility interface

IEC 62116 Latest Version, Utility-interconnected photovoltaic inverters - Test procedure of islanding prevention measures.

UNE-EN 50438 Latest Version, requisitos para la conexión de microgeneradores en paralelo con redes generales de distribución de baja tensión.

GRID CODE

GERMANY

BDEW Guideline Latest Version

VDE-AR-N-4105 Latest Version: Generators connected to the low-voltage distribution network – Technical requirements for the connection to and parallel operation with low-voltage distribution networks

VDE-AR-N 4110 Latest Version: Technical requirements for the connection and operation. Of customer installations to the medium voltage network (TAR medium voltage)

VDE-AR-N4120 Latest Version: Technical requirements for the connection and operation of customer installations to the high voltage network (TCR high voltage)

VDE-AR-N 4130 Latest Version: Technical requirements for the connection and operation. Of customer installations to the extra high voltage network (TCR extra high voltage)

GRID CODE

GERMANY

DIN V VDE V 0126-1-1: Automatic disconnection device between a generator and the public low-voltage grid.

Technical Guidelines for Power Generating Units and Systems PART 3 (TG 3): Determination of the Electrical Characteristics of Power Generating Units and Systems in Medium-, High- and Extra-High Voltage Grids; Latest Revision

Technical Guidelines for Power Generating Units and Systems PART 4 (TG 4): Demands on Modelling and Validating Simulation Models of the Electrical Characteristics of Power Generating Units and Systems; Latest Revision

Technical Guidelines for Power Generating Units, Systems and Storage Systems as well as for their Components PART 8 (TG 8): Certification of the Electrical Characteristics of Power Generating Units, Systems and Storage Systems as well as their Components on the Grid; Latest Revision

GRID CODE

PHILIPPINES

Philippine grid code 2016

INDIA

CEA 2019: Central Electricity Authority (CEA) notification 2019

Indian Electricity Grid Code

JORDAN

IRR-DCC-MV:2015: Intermittent Renewable Resources (Wind and PV) distribution Connection Code (DCC) at Medium Voltage (MV)

IRR-TIC:2014: Intermittent Renewable Resources (IRR) Transmission Interconnection Code (TIC)

PORTUGAL

AMBIENTE E AÇÃO CLIMÁTICA 73 Latest Version: Requisitos não exaustivos para ligação dos módulos geradores à Rede Elétrica de Serviço Público.

GRID CODE

SPAIN

Real Decreto 244 Latest Version: de 5 de abril, por el que se regulan las condiciones administrativas, técnicas y económicas del autoconsumo de energía eléctrica.

UNE 217001 Latest Version: Ensayos para sistemas que eviten el vertido de energía a la red de distribución.

UNE 206007-1 Latest Version: Requisitos de conexión a la red eléctrica. parte 1: inversores para conexión a la red de distribución.

UNE 206007-2 IN: Requisitos de conexión a la red eléctrica. Parte 2: Requisitos relativos a la seguridad del sistema para instalaciones constituidas por inversores.

UNE 217002 Latest Version: Inversores para conexión a la red de distribución. ensayos de los requisitos de inyección de corriente continua a la red, generación de sobretensiones y sistema de detección de funcionamiento en isla.

UNE-EN 60601-1/A1 Latest Version: Equipos electromédicos. Parte 1: Requisitos generales para la seguridad básica y funcionamiento esencial.

GRID CODE

FRANCE

Guide pratique UTE C 15-712-1 Latest Version: Installations photovoltaïques connectées au réseau public de distribution.

Arrêté du 9 juin 2020: relatif aux prescriptions techniques de conception et de fonctionnement pour le raccordement aux réseaux d'électricité.

ITALY

CEI 0-16. Latest Version: Regola tecnica di riferimento per la connessione di Utenti attivi e passivi alle reti AT ed MT delle imprese distributrici di energia elettrica.

CEI 0-21 Latest Version: Regola tecnica di riferimento per la connessione di Utenti attivi e passivi alle reti BT delle imprese distributrici di energia elettrica.

THAILAND

PEA (Provincial Electricity Authority) Regulation on the Power Network System Interconnection Code: 2016

MEA (Metropolitan Electricity Authority) Grid-connected Inverter Regulation: 2013

GRID CODE

UNITED KINGDOM

ENA-EREC G99: Engineering recommendation. Latest Version. Requirements for the connection of generation equipment in parallel with public distribution networks on or after 17 May 2019.

ENA-EREC G98: Requirements for the connection of Fully Type Tested Micro-generators (up to and including 16 A per phase) in parallel with public Low Voltage Distribution Networks on or after 27 April 2019

ENA-EREC G59: Recommendations for the Connection of Generating Plant to the Distribution Systems of Licensed Distribution Network Operators.

ENA-EREC G83: Recommendations for the Connection of type tested Small-scale Embedded Generator (Up to 16A per Phase) in Parallel with Low-Voltage Distribution System.

KENYA

Kenya Electricity Grid Code

Official Gazette Communique - Number 28783: Communique on implementation of the regulation related with unlicensed electricity generation in electricity market.

GRID CODE

MALASYA

MS 1837:2015: installation of grid-connected photovoltaic (PV) system.

BRAZIL

NDU 013:2019: Critérios para a Conexão em Baixa Tensão de Acessantes de Geração Distribuída ao Sistema de Distribuição.

NDU 015:2012: critérios para a conexão de acessantes de geração distribuída ao sistema de distribuição da energia- conexão em média tensão.

ABNT NBR 16149:2013: Sistemas fotovoltaicos (FV) – Características da interface de conexão com a rede elétrica de distribuição.

ABNT NBR 16150:2013: Sistemas fotovoltaicos (FV) – Características da interface de conexão com a rede elétrica de distribuição - Procedimento de ensaio de conformidade.

INMETRO ordinances 004/2011: Portaria nº 004/2011

INMETRO ordinances 357/2014: Portaria nº 357/2014

GRID CODE

PERU

COES SINAC:2013: Procedimiento técnico del comité de operación económica del SEIN. Aprobado mediante Resolución OSINERGMIN N°035-2013-OS/CD.

BELGUIM

C10/11 Latest Version: Specific technical prescriptions regarding power-generating plants operating in parallel to the distribution network.

EGYPT

Egyptian Transmission Grid Code:2017: Solar Energy Plants Grid Connection Code.

Egyptian Transmission Grid Code:2014: Wind Farm Grid Connection Code.

PANAMA

Código de Redes fotovoltaico, Resolución NA No.8774-elec:2015: normas técnicas, operativas y de calidad, para la conexión de los sistemas de centrales solares y centrales solares con tecnología fotovoltaica al sistema interconectado nacional (sin).

GRID CODE

CHILE

NTCO:2019: norma técnica de conexión y operación de PMGD en instalaciones de media tensión.

NTSyCS:2020: norma técnica de seguridad y calidad de servicio.

NIGERIA

Nigerian Grid Code 2014: The Grid Code and guidelines shall be called the Grid Code for the Electricity Industry of Nigeria.

MEXICO

CRE-3025: manual regulatorio de planeación del sistema eléctrico nacional.

ROMANIA

ORDIR 30 Latest Version: Technical conditions for connection to power grids of public interest for photovoltaic power plants.

GRID CODE

SOUTH AFRICA

RPPS:2019: Grid connection code for Renewable Power Plants (RPPS) connected to the electricity transmission system (TS) or the distribution system (DS) in South Africa.

NRS 097-2-1:2010 ed.2: Grid interconnection of embedded generation Part 2: Small-scale embedded generation.

MOROCCO

Moroccan Grid Code:2014: Conditions de raccordement des éoliennes et parcs solaires a base de PV au réseau national de transport.

DUBAI

DEWA:2016: standards for distributed renewable resources generators connected to the distribution network.

GRID CODE

AUSTRIA

TOR Erzeuger: Anschluss und Parallelbetrieb von Stromerzeugungsanlagen des Typs A und von Kleinsterzeugungsanlagen. Latest Version

TOR Erzeuger: Anschluss und Parallelbetrieb von Stromerzeugungsanlagen des Typs B. Latest Version

AUSTRALIA

AS/NZS 4777.2:2015: Grid connection of energy systems via inverters Part 2: Inverter requirements

AS/NZS 4777.3:2005: Grid connection of energy systems via inverters – Grid protection requirements

AS/NZS 3100:2009 + amd2:2012: Approval and test specification – General requirements for electrical equipment

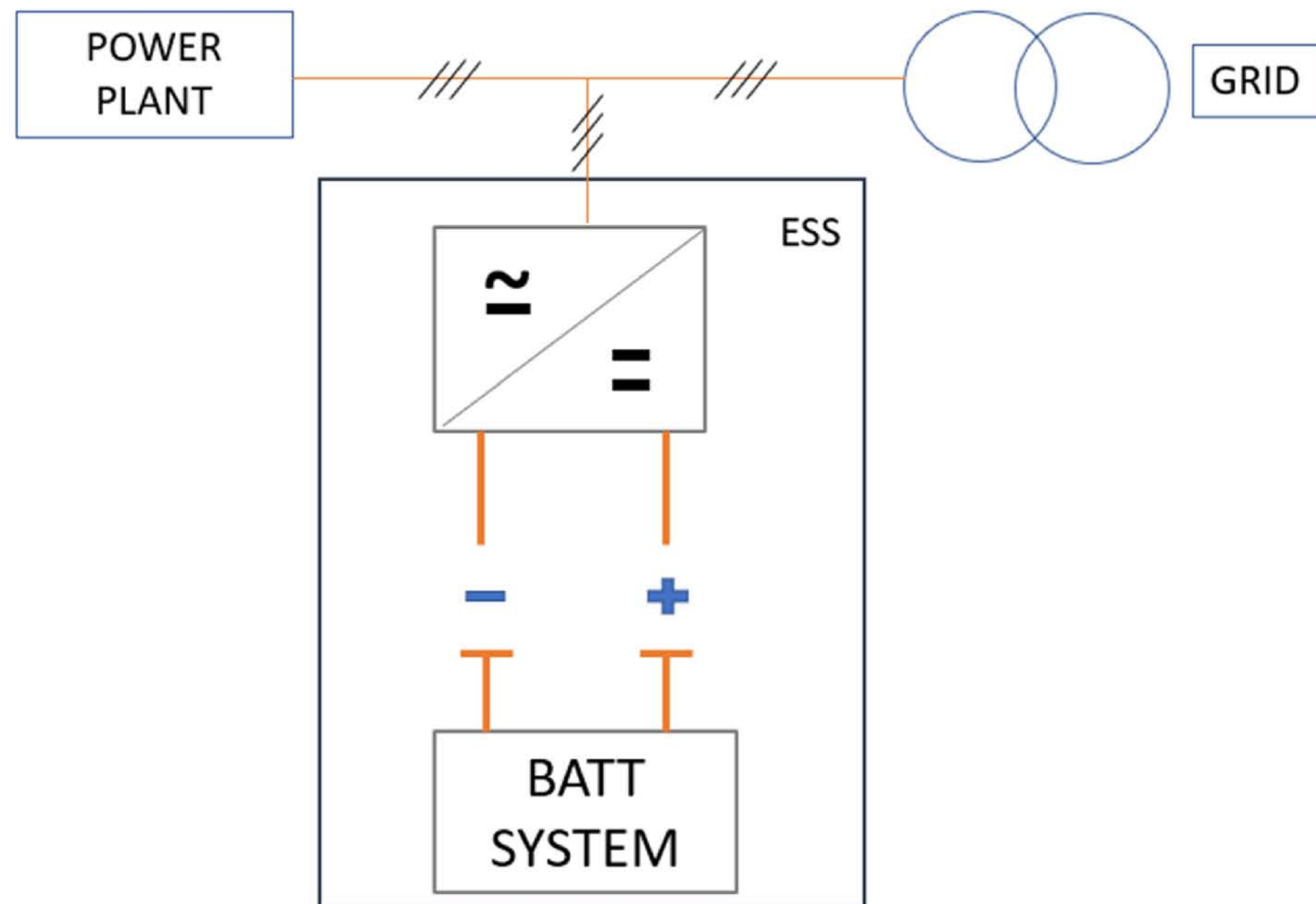
USA

UL 9540: 2020: Standard for Safety Energy Storage Systems and Equipment.

IEEE Std 1547.1-2020: IEEE Standard Conformance Test Procedures for Equipment Interconnecting Distributed Energy Resources with Electric Power Systems and Associated Interfaces

Electric Rule 21: generating facility interconnections.

Full Power Plan including ESS compliance



For the Energy Storage System certification integrated in a Power Plan it is necessary to model the full Power Plan including the ESS and simulate the compliance with the Grid Connection applicable standard.

CERE, by UL Solutions Simulation department has a large experience modelling these type of installations and fulfilling compliance with multiple Grid Code worldwide as VDE for Germany, CEI for Italy, Australian standards or LATAM standards.

Laboratory Capabilities



EMC

- ✓ Full Anechoic Chamber of 3 meters and up to 6GHz both in emission and radiated immunity.
- ✓ Complete test capacity of IEC 61000 in both radiated and conducted.



Test Benches

- ✓ Test bench up to 500kVA for converters
- ✓ 3 test benches up to 166kVA with parallel connection capacity.
- ✓ DC voltage range up to 1500V and AC voltage range up to 800V and 400Hz
- ✓ Passive loads up to 100kVA and electronic load up to 500kVA for island testing.



Environmental and Climate Laboratory

**TEMPERATURE RANGE FROM -40°C TO 85°C WITH
85%RH OR 125°C WITHOUT HUMIDITY REFERENCE.**

- ✓ Low temperature chamber
- ✓ High temperature chamber
- ✓ Temperature chamber
- ✓ Dycometal temperature chamber

- ✓ Binder temperature chamber
- ✓ IP and Nema Camera
- ✓ Vibration table
- ✓ Saline atmospheres chamber

Disclaimer

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